

**ABSTRACT OF THE DISCLOSURE**

A system efficiently determines of the likely effectiveness of the cache memory for various cache memory sizes, based on a prediction of the likely cache miss rate, the prediction being based on operational statistics which are gathered during actual use of the cache memory over one or more time periods, and based on a variety of cache management methodologies. Based on the prediction, the operator or the system can facilitate increasing or decreasing the size of the cache memory, or maintaining the cache memory at its then-current size. The system determines the cache memory's read miss rate from statistics that are collected during use of the cache memory over an arbitrary time interval, including statistics concerning the file information retrieval activity and the extent of activity per unit time for system. Based on the statistics, equations, which are based on the respective cache memory management methodology, including the FIFO (first-in/first-out) methodology or the LRU (least-recently used) methodology, used in managing the cache memory, are solved to generate a prediction of the cache miss rate for a particular cache memory size, which may be larger or smaller than the current cache memory size, and for the particular cache memory management methodology. The system can repeat this a number of times over respective time intervals to determine corresponding predictions based on the cache memory utilization for respective sets of statistics determined during each time interval. Thereafter, the system or an operator can effect a change in the cache memory size based on the cache miss rate predictions.